To: Seyfried, Erin[Seyfried.Erin@epa.gov]
From: Lana.Davis@shell.com
Sent: Tue 9/10/2013 10:38:46 PM
Subject: RE: Geotech Scope of work questions for permit -

Oops – one last question: N-Rod is another method of wet rotary drilling in which the hole is cased and drilled with what the industry designates as N-Rod. It perofrms teh same function of drill pipe, but is a drill rod with a diameter of about 2.75 inches as compared to 4-1/2 inches for API pipe. It is a drilling rod specific to onshore geotechnical investigations.

From: Davis, Lana SEPCO-UAA/A/SR
Sent: Tuesday, September 10, 2013 2:38 PM
To: Seyfried, Erin
Subject: FW: Geotech Scope of work questions for permit -

Hi Erin - We do not foresee any on-ice work in 2014 for either asset. We suspect we are looking at a 20-borehole on-ice program for the Chukchi in 2014. We do not have a good feel for more on-ice Beaufort work, but if it was to happen, it would be in 2016 or beyond.

For 2014 we will only be doing approximately 35 to 40 offshore boreholes offshore in the Chukchi. From 2015 on we could conceivably do both a nearshore Chukchi program from a liftboat and an offshore program from a boat. If we also do a 2015 on-ice program then we could conceivably do around 100 boreholes in one year.

Hope this helps.
Lana

From: Seyfried, Erin [mailto:Seyfried.Erin@epa.gov]
Sent: Tuesday, September 10, 2013 10:26 AM
To: Davis, Lana SEPCO-UAA/A/SR
Cc: Shaw, Hanh
Subject: RE: Geotech Scope of work questions for permit -

Thank you, Lana.

I just have two questions based on the information you provided.

--Would the on-ice program be in addition to an open water program? (i.e. ~40 open water boreholes PLUS 40-50 on-ice holes in the Beaufort and ~20 on-ice holes in the Chukchi for a year-end of *approximately* 100 – 120 holes per calendar year)

--What is an "N-Rod?"

Thanks!

Erin E. Seyfried, M.S.

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From: Lana.Davis@shell.com [mailto:Lana.Davis@shell.com]
Sent: Friday, September 06, 2013 6:18 PM
To: Seyfried, Erin; chris.foley@alaska.gov
Subject: Geotech Scope of work questions for permit -

Hi Erin-

Thanks for calling in this afternoon to clarify on your questions with respect to our Geotech permit application. As discussed on the phone, below is the write up of our on-ice drilling scope of work. I'm including Chris Foley with ADEC on this e-mail as I from the school if you had a question I'm sure he did as well.

Let me know if you have any further questions or if you need further clarity on the on-ice scope.

Have a good weekend.

Regards,

Lana

Number of boring in state waters (shore out three miles) and federal waters (3 miles beyond). No on-ice drilling planned for 2014, we will eventually do about one boring every 1,000 ft in state waters for a total of 15 or 16 in any year and the rest we would do in Federal waters. Maybe a 1/3 state water and 2/3 federal waters split would be more appropriate. Once again, this is just speculation, but it is the best we can project with the knowledge we have at this time. In the Beaufort, landfast ice extends out beyond the barrier islands and we would most likely do anywhere from 40 to 50 borings (mostly less than 100 ft penetration) for an on-ice program in any season. In the Chukchi around Wainwright there are no barrier islands and the landfast ice does not extend very far offshore. Thus, we would do, comparably, many fewer on-ice borings in the Chukchi. Probably less than 20 for a shore approach and beach crossing, and some onshore to tie in with land data. Most of the Chukchi state waters work will have to be done from a liftboat or something similar during the open-water season.

If drilling on ice would there be drilling fluids used? In general a better description of our on ice drilling and how we think the cuttings would be discharged (i.e. on ice, in space between land fast ice and borehole? We could employ any number of methods for drilling on ice including wet rotary techniques, hollow stem auger, N-Rod, etc, depending on our goals for the program. In general, if we were drilling on land or from landfast ice we would case the borehole and take the returns in the mud pit at the surface (inside the protected drilling area of a Rollogon). We could then separate the drill cuttings from the drill mud and store the cuttings in 55 gallon barrels for later disposal in a landfill. Under no circumstances would we leave the cuttings on the surface of the ice at a drill site. If we elected to drill 'open-hole' then the drill cuttings would be discharged at the mudline in the seawater gaps between the ice and seabed.

Lana Davis

Environmental Engineer

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